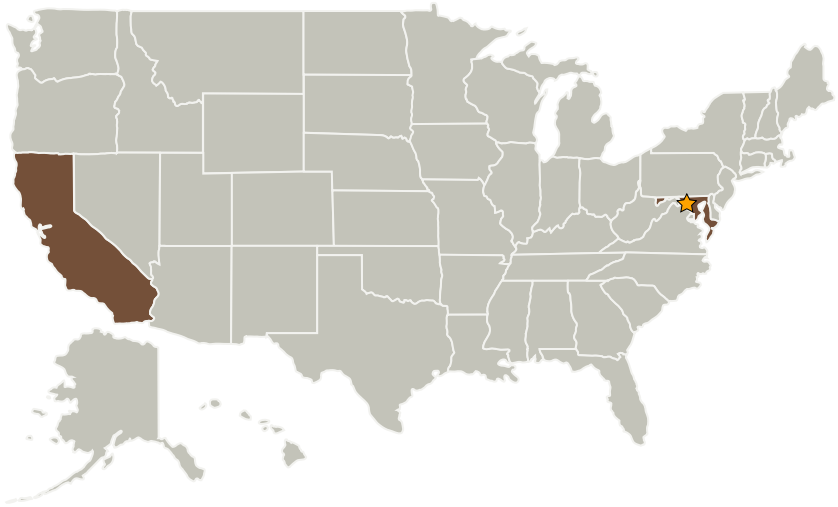
Switching Fabric Based on Multi-Level LVDS Compatible Interconnect, Phase II

Completed Technology Project (2004 - 2006)

Project Introduction

Switching fabric (SF) is the key component of the next generation of back plane interconnects. Low power, TID and SEU resistant and high bandwidth upgradeable communication between computer nodes are of utmost importance for future NASA missions. The current state off-the-art binary SF interconnect architectures have high power consumption and latency due to the necessity to perform internal data conversion and synchronization in order to recognize redundant bits and extract useful information from the data stream. The high power consumption of the SFs limit their application in the next generation of nano-satellites. In order to minimize latency and reduce power consumption, we propose a novel, robust, radiation tolerant and easy-to-align SF based on a multi-level power efficient Low Voltage Differential Signal interface. Our approach uses differential multilevel signals to mark a reference high-level bit position in one of the differential channels. Because the marked pilots will follow the high logic level in one of the differential outputs, they will regularly occur at the same bit position and ensure stable and easy recovery of the low-speed clock signal, which will be used as a reference for multi-channel data alignment and will synchronize high speed clocking circuitry using a standard clock multiplier technique.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Advanced Science and Novel Technology	Supporting Organization	Industry	Rancho Palos Verdes, California

Primary U.S. Work Locations	
California	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.2 Avionics Systems and Subsystems
    - TX02.2.6 Data Acquisition Systems